



Mechanisms of internalization of brain pericyte-derived extracellular vesicles by the endothelial cells composing the blood-brain barrier

Ph.D project funded by the French National Research Agency (ANR) and directed by
by Pr. Laurence TILLOY-FENART and Dr. Julien SAINT-POL

*Blood-Brain Barrier Laboratory (LBHE) - UR2465 - University of Artois, Jean Perrin Faculty of Sciences, Lens,
France. Contact: julien.saintpol@univ-artois.fr*

The blood-brain barrier (BBB) is an interface that is not very permissive to the entry of circulating compounds into the brain parenchyma, thus maintaining brain homeostasis (Menaceur et al., 2021; Gosselet et al., 2021). The properties of the BBB, located at the level of the endothelial cells (ECs) of the cerebral microvessels, result from intercellular communications with the cells of the close vicinity, mainly by brain pericytes (BPs), and notably by extracellular vesicles or EVs (Saint-Pol et al., 2020). The BBB seems to be crossed by brain-derived or circulating EVs in physiological and pathological conditions. However, the transport mechanisms of these vesicles across the BBB endothelial cells remain unknown. The Ph.D project aims to overcome this scientific latch.

The candidate will work on a current topic in the fields of the BBB and cell-cell communication, in a European and national collaborative framework between the University of Artois and the University of Picardie Jules Verne in the framework of the A2U Alliance. Moreover, the LBHE, located in the Hauts-de-France region within the Jean Perrin Faculty of Sciences in Lens, is one of the leading laboratories in this field in Europe and has recognized expertise in the modelling of the BBB and its use in pharmacokinetics (collaborations with Astra Zeneca, Biovitrum, ...).

Skills needed and technical prerequisites: quick adaptability and autonomy, ability to work in a group, to listen and to share tasks, standard molecular biology/biochemistry analyses (qRT-PCR, Western blot), solid experience in cell culture. Awareness of EV isolation and purification techniques would be appreciated.

Approaches envisaged: Multimodal approaches to characterise EVs (molecular biology/biochemistry, proteomics, genomics, lipidomics, microscopy), cell culture, physiology of transcytosis through BBB endothelial cells, immunolabelling and immunofluorescence for microscopic analysis (epifluorescence, confocal), transient and stable transfection of plasmids, monitoring of transcytosis routes.

How to apply?

The deadline for applications is **May 1st 2022**. It will be essential to provide for all applications:

- A complete and detailed CV, in particular on the level of experience of the requested prerequisites
- Letter of motivation
- Recommendations or contact person for recommendation
- Certificate of successful completion of the Master's degree or results of the current Master's degree (if Master's degree completed in the academic year 2021-2022)

Contact: julien.saintpol@univ-artois.fr